

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 2003B137	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/EP2004/014477	International filing date (day/month/year) 16/12/2004	(Earliest) Priority Date (day/month/year) 18/12/2003
Applicant EXXONMOBIL CHEMICAL PATENTS INC.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box II).

3. ☐ **Unity of invention is lacking** (see Box III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. _____

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/014477

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07C45/50 C07C29/141

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	GB 643 503 A (BATAAFSCHE PETROLEUM) 20 September 1950 (1950-09-20) page 1, line 63 - line 85 page 2, line 122 - page 2, line 6 page 3, line 75 - page 4, line 66 * figure 3: 15->16->17->10->12->13 and 38->32->27->22->16->17->10->12->13 *	1-4, 7, 8, 10, 11, 18-33 5, 6, 9, 12-17
X Y	DE 100 35 120 A (BASF AG) 25 January 2001 (2001-01-25) page 4, line 14 - line 22 page 6, line 11 - line 17; figure 1 ----- -/--	1, 4, 7-10, 18-29 5, 6

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

8 document member of the same patent family

Date of the actual completion of the international search

27 April 2005

Date of mailing of the international search report

06/05/2005

Name and mailing address of the ISA

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Authorized officer

Kardinal, S

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/014477

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 188 246 A (UNION CARBIDE CORP) 23 July 1986 (1986-07-23)	1,4,18, 20
Y	column 1, line 6 - line 13 column 7, line 46 - line 62 column 8, line 42 - line 56; figure 1 -----	5,6
Y	US 3 868 422 A (HAGEMeyer JR HUGH J ET AL) 25 February 1975 (1975-02-25) column 2, line 33 - line 41 -----	5,6
Y	US 3 188 351 A (HANS LEMKE) 8 June 1965 (1965-06-08) the whole document -----	9,12-14
Y	DE 102 27 995 A (OXENO OLEFINCHEMIE GMBH) 25 September 2003 (2003-09-25) column 10, paragraph 62 - column 11, paragraph 66 -----	9,15-17
A	US 4 049 725 A (GUEANT AUGUSTE ET AL) 20 September 1977 (1977-09-20) cited in the application the whole document -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/014477

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 643503	A	20-09-1950	NONE	
DE 10035120	A	25-01-2001	DE 10035120 A1	25-01-2001
EP 0188246	A	23-07-1986	US 4593127 A	03-06-1986
			AT 73752 T	15-04-1992
			AU 594034 B2	01-03-1990
			AU 5222986 A	17-07-1986
			CA 1258871 A1	29-08-1989
			CN 86101063 A , B	20-08-1986
			CS 8600264 A2	13-10-1989
			DE 3684335 D1	23-04-1992
			DK 11486 A	12-07-1986
			EP 0188246 A2	23-07-1986
			ES 8701710 A1	01-03-1987
			FI 860125 A , B,	12-07-1986
			IN 166934 A1	11-08-1990
			JP 61218546 A	29-09-1986
			KR 9008107 B1	31-10-1990
			YU 2686 A1	29-02-1988
			ZA 8600222 A	27-08-1986
US 3868422	A	25-02-1975	NONE	
US 3188351	A	08-06-1965	FR 1223381 A	16-06-1960
DE 10227995	A	25-09-2003	DE 10227995 A1	25-09-2003
			AU 2003212316 A1	29-09-2003
			WO 03078365 A2	25-09-2003
			EP 1485341 A2	15-12-2004
US 4049725	A	20-09-1977	FR 2269511 A1	28-11-1975
			AR 203790 A1	15-10-1975
			AT 338221 B	10-08-1977
			AT 323775 A	15-12-1976
			AU 8056875 A	04-11-1976
			BE 826894 A1	16-07-1975
			BR 7502595 A	09-03-1976
			CA 1052395 A1	10-04-1979
			DE 2519011 A1	06-11-1975
			ES 437215 A1	16-01-1977
			GB 1453267 A	20-10-1976
			IT 1032763 B	20-06-1979
			JP 950583 C	27-04-1979
			JP 51029406 A	12-03-1976
			JP 53031847 B	05-09-1978
			NL 7505089 A	03-11-1975
			SU 1060102 A3	07-12-1983

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2004/014477

International filing date (day/month/year)
16.12.2004

Priority date (day/month/year)
18.12.2003

International Patent Classification (IPC) or both national classification and IPC
C07C45/50, C07C29/141

Applicant
EXXONMOBIL CHEMICAL PATENTS INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/014477

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/014477

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	5,6,11-17,19,21-29,33
	No: Claims	1-4,7-10,18,20,30-32
Inventive step (IS)	Yes: Claims	
	No: Claims	1-33
Industrial applicability (IA)	Yes: Claims	1-33
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

PCT/EP2004/014477

Re Item V.

1. Reference is made to the following documents :

- D1: GB 643 503 A (BATAAFSCHE PETROLEUM) 20 September 1950
- D2: DE 100 35 120 A (BASF AG) 25 January 2001
- D3: EP-A-0 188 246 (UNION CARBIDE CORP) 23 July 1986
- D4: US-A-3 868 422 (HAGEMEYER JR HUGH J ET AL) 25 February 1975
- D5: US-A-3 188 351 (HANS LEMKE) 8 June 1965
- D6: DE 102 27 995 A (OXENO OLEFINCHEMIE GMBH) 25 September 2003

2. Novelty and Inventive Step

2.1 Document D1 discloses (cf. the passages indicated in the international search report) a process for the production of alcohols by high pressure hydroformylation of olefins and subsequent hydrogenation of the hydroformylation product.

The hydroformylation (D1: first stage) takes place in two hydroformylation reactors (Fig. 3: 4, 14). Unreacted gases from the hydroformylation and unreacted hydrogen from the subsequent hydrogenation reaction, which takes place in a second (Fig. 3: 25) and third stage (Fig. 3: 35), are recycled to the first and second reactor of the hydroformylation stage (Fig. 3: 15->16->17->10->12->13 and 38->32->27->22->16->17->10->12->13).

The subject-matter of claims 1-4, 7-10, 18, 20 and 30-32 is therefore not novel (Article 33(2) PCT).

Documents D2 and D3 disclose (cf. the passages indicated in the international search report) further hydroformylation processes falling within the scope of the present application.

2.2 The use of three, four or more hydroformylation reactors according to claims 5 and 6 is disclosed in D4. The removal of cobalt carbonyl catalysts from hydroformylation products by treatment with alkali and acidic and/or oxidative

methods according to claims 12-17 is also known from the prior art (D5, D6). Duplex stainless steel is a known pressure resistant material. The remaining dependent claims seem to relate to usual process conditions or routine variations thereof and do not seem to contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of the inventive step.

In view of the above, even if novelty could be established over the prior art (D1-D3), it seems unlikely that an inventive step could be acknowledged unless an unexpected technical effect or improvement can be shown, resulting directly from the technical differences which confer novelty over the prior art.